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"THE POLITICS OF REMOTE SENSING"

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This nation is facing some of its toughest tests as it moves through the beginning decade of its third century. Not the least of these tests will be the "technology" test.

Will we develop the institutional foundations, the national will and the political maturity to use technology to survive as a nation. or will we give up: throw it in on the greatest human experiment of all time?

Throughout its history, science and technology have provided the United States with its most significant new national policy options. That the overwhelming majority of the American people believe this to be true and will be true in the future has been shown by survey after survey.

Look at a few of the most obvious examples from the past:

The transcontinental railroad opened up a continent and preserved the destiny of a new nation.

The automation of manufacturing laid the foundation for our early economy and the defense of freedom in two world wars.

The ongoing agricultural revolution not only has fed our people and spurred their economic growth, but has fed much of the world.

The science and technology of ore mineral, oil and gas exploration provided the base for our modern national growth.

The construction of the Panama Canal established the U.S. as the dominant maritime and trading nation of the world as well as created new technology for our industry.

The harnessing of nuclear energy, although incomplete, ended a war, prevented other wars, and could provide inexhaustible energy for mankind if we are wise enough to handle it.

The electronics revolution has drawn the people of the world together with a potential for good unmatched in history.

The vast base of technology from our space endeavors supplies a continuous stream of new services in an infinite number of areas. These include not only remote sensing of our environment and its resources, but health care, communications, computers, energy efficiency, and consumer products, to name only a few.

There are many more examples which, on close examination, show that critical new policy options were created by science and technology for the expansion, growth and protection of the nation and the vast improvement of the well-being of its citizens. True, through ignorance or neglect there have been adverse consequences from these new technologies, but the total benefits far outweigh the costs. Few Americans would advocate turning back the clock; however, as we move even more aggressively into the future, we must learn from the mistakes in judgment in the past.

Remote sensing, as a major component of the information age that is on the horizon, is one of the as yet untapped technological resources for the making of new policy. The political immaturity with which our governmental institutions deal with this vast policy resource is enough to frost a chile pepper.

For example, information systems technology, in the broadest sense, makes it possible to rationally imagine the gradual elimination

of hunger, disease, poverty and ignorance in the underdeveloped portions of the world. These four horsemen of disaster are rushing down on mankind and freedom at unparalleled speeds. However, for the first time in human history, we can consider technically realistic means of stopping their onslaught and using that capability as the foundation of our foreign policy toward the underdeveloped nations of the world.

The foundations for this new foreign policy lie in the gathering, analysis, distribution and use of information. There is no present indication that our institutions and their leaders have any conception of what that statement means.

The collection and distribution of information on a worldwide basis via satellite has provided a distinct change in the course of human history. The most graphic demonstration of this change came when, on Christmas Eve, 1968, hundreds of millions of human beings throughout the world, simultaneously had a new thought about a familiar object in the night sky - the Moon. The men of Apollo 8 were there, and the Moon would never be the same for anyone. Now, we realize that the world will never be the same; that there are solutions to those age old problems of the human condition on Earth. There are solutions if we are wise enough to reach out and grasp them.

Through information technologies, we can and should create programs aimed at permanent, eventually self-financing, services for worldwide communications, weather and ocean forecasting, Earth resources discovery or monitoring, societal services like education, and prediction of natural events of disastrous human consequences or broad scale economic impact.

Through technology and know-how we can and should help underdeveloped nations create agricultural, health, resource and educational systems that permit their entry into the 20th century.

During the last days of the 95th Congress, and then again in the current 96th Congress, I introduced a National Aeronautics and Space Policy Act. As proposed implementing legislation for that Act, I also introduced an Earth Resources Information Satellite Corporation Act. If it were enacted into law, this second bill, the "EARTHSAT Bill," would provide the statutory basis for the creation of a commercial operational service, modeled after COMSAT, for the gathering and dissemination of Earth resources information for both domestic and foreign markets.

We have done nothing but go backward since the introduction of this legislation. One has to wonder if the introduction of these bills was to blame. I hope not. In fact, I am confirmed in my belief in the "EARTHSAT" approach by the stumbling move by the Carter administration to give NOAA interim responsibility to develop an operational Earth resources system and its subsequent budget decisions that clearly make it impossible for NOAA or any government agency to succeed, much less compete with more aggressive foreign interest.

But before I sink into a fit of depression over what might be but now is not, let me review the basic foundations upon which the politics of remote sensing rest.

The terms "Earth Resources Information" and "Remote Sensing" are gradually becoming a part of our everyday vocabulary, although not yet exactly household phrases.

Remote sensing as an art in science has been around for a long time; first and foremost in the form of man's eyes. We are very far from duplicating, with instruments and systems, the capabilities of those eyes and their unbelievable sophisticated data processing system we call the brain. However, we have learned over the past decade to vastly extend their reach through satellites, high-altitude aircraft, increased knowledge about the Earth and its resources, an explosion of technology in the sensing of the response of natural materials to electromagnetic radiation, and an unbelievable expansion of data processing techniques. These technologies have all contributed to making visible and useful that which was previously hidden and wasted.

It is this extension of our ability to use our eyes and brain to observe, integrate, synthesize, interpret and apply that which we have come to know as remote sensing.

The broad scale use of the unique view of Earth offered by satellites began in the 1960's with the development of telecommunications and weather satellite systems. The obvious success of these efforts, culminating in COMSAT, INTELSAT, and the World Weather Watch, was based on the long-established need for global communications and weather information. In addition, there was in existence a long-established institutional base to use telecommunications and weather information.

The need for modern Earth resources information and the institutional base to serve those needs has developed slowly in spite of the obvious potential of such information. Unlike telecommunications and weather data, remotely gathered Earth resources information was not in general use prior to the space age since it was not available except in the form of standard serial photography. With the existence and

ever-broader potential of information from the Landsat and Seasat systems, the increased understanding of the techniques and value of data from such systems, most people agree that the time has come to develop an operational Earth resources information service.

Commercial and governmental applications for the information from an operational system have been well demonstrated. In particular, the following major areas for the utilization of remote sensing capabilities can be cited:

- Improved agricultural information and production based on the identification and repetitive monitoring of crop yields, damage, and infestations.

- Improved rangeland management and production based on repetitive evaluation of vegetation, soil, water, and livestock characteristics.

- Improved forest products production based on identification of types and suitability of trees and on repetitive monitoring of change due to natural and human effects.

- Improved water resources management through direct and repetitive measurement and evaluation of surface water, and by geological evaluation of soil and subsurface features of hydrological significance.

- Improved targeting of favorable localities for mineral and energy exploration and for expanded production based on more rapidly available and higher quality geologic maps, and on the sensing of various chemical elements due to their influence on vegetation, mineral, soil, textural, or thermal characteristics.

- Improved repetitive identification of adverse changes in urban and rural situations due to human habitation.

- Improved monitoring of natural or artificial environmental changes based on repetitive evaluation using a wide variety of techniques.

- Improved identification, evaluation and monitoring of marine and coastal resources.

This foundation, plus the broad policy benefits, have convinced me of the viability of a commercially-based operational system for the gathering, preprocessing and marketing of remotely gathered Earth resources information.

Well-established operational programs exist in telecommunications and weather-forecasting. The presently operational entities of these programs are, respectively, in the COMSAT/INTELSAT and NOAA/World Weather Watch activities.

These two types of activity illustrate several of the organizational and management options available in the development of an operational Earth resources information system. Yet, the United States has not meaningfully come to grips with how it will reap the economic and political advantages of this technology it introduced to the world.

As with telecommunications, the potential advantages in the use of Earth resources information lie in both the commercial and public sectors. This fact indicates to me that the operational management of an Earth resources information system should be organized as an investor-owned, regulated corporation, modeled after the successful experience with COMSAT in the telecommunications field.

Unfortunately, the politics of remote sensing in the United States have not come of age. It appears we are doomed, if present trends are allowed to continue, doomed to stumble along in costly bureaucratic

reorganization, one-tape recorder away from having nothing to reorganize for, while other nations steal the technological march.

We have suffered policy paralysis brought on by ignorance or, worse, by calculated indecision in fear of both free enterprise and technology. The rapid cure for this paralysis exists, but the medicine of constructive action is too strong for the advocates of the decline of our national fortunes.

Help me, help yourselves, convince this great country that its golden age is ahead and that information technology is part of that age. Get involved. Stay involved.

Thank you.